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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/829,715	04/10/2001	William R. Crumly	41253/WPC/P526	8431

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EXAMINER

PATEL, ISHWARBHAI B

ART UNIT PAPER NUMBER

2827

DATE MAILED: 09/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/829,715

Applicant(s)

CRUMLY, WILLIAM R.

Examiner

Ishwar (I. B.) Patel

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 14-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-13, drawn to a flexible circuit, classified in class 174, subclass 254.
 - II. Claims 14-19, drawn to a method of constructing a flexible circuit, classified in class 29, subclass 830.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions group II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process such as the product does not require to determine the total modulus of the flexible circuit and the patch, does not require to determine the total cross section area of the flexible circuit, does not require to choose a first estimate of the thickness of the patch the patch.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and the

search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with David Bailey on August 27, 2002 a provisional election was made with traverse to prosecute the invention of a flexible circuit, claims 1-13. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-19 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Drawings

5. The drawings are objected to because figures are improperly crosshatched. All of the parts shown in section, and only those parts, must be crosshatched. The cross hatching patterns should be selected from those shown on page 600-81 of the MPEP based on the material of the part. See also 37 CFR 1.84(h)(3) and MPEP 608.02.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities:

Page 2, line 1-10, describe circuit that are on the side of the neutral plane closest to the bending axis experience compressive force and that on the side of neutral plane

remote from the bending axis experience tensile bending forces, but the description on page 22, line 17-28 describe opposite of that, conductive layer 100 furthest from the bending axis 120 experience compressive forces and other conductive layers 101 and 102 experience tensile forces.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

8. Claims 1-2, 8,10-11 and 13 are rejected under 35 U.S.C. 102(a) as being anticipated by Japanese Patent Publication Number JP 11204898 A, hereafter JP898.

Regarding claim 1-2 and 10-11, JP898 discloses a flexible circuit having a neutral plane and configured to be bent about an imaginary bending axis, said flexible circuit comprising:

at least one dielectric layer (base film layer 3 and inner cover film layer 5);

at least two electrically conductive layers, wherein said electrically conductive layers are separated by dielectric layers (outer cover film layer1 and inner copper film layer 4); and

a patch on the side of said flexible circuit opposite from the imaginary bending axis, said patch configured so that the neutral plane is located either inside the electrically conductive layer that is remote from the bending axis, or between the outer surface of said electrically conducting layer and the outer surface of said patch (outer cover film layer 1).

Regarding claim 8 and 13, JP898 further discloses conductive layer made of copper.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 3-7, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Publication Number JP 11204898 A, hereafter JP898, as applied to claims 1 and 2 above.

Regarding claims 3 and 4, the applicant is claiming various location of the neutral plane in relation to the outer surface of the flexible circuit. However, the distance will be adjusted depending upon the strength of the conductive layer for required satisfactory life of the circuit. Further, once it is known that by changing the thickness of the outer

layer, it will be possible to change the relative location of the neutral plane, the location of the neutral plane for specific circuit board can be adjusted to get the longer satisfactory life. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made provide the circuit board of JP898 to have the locations of neutral plane as claimed in claim 3 and 4 in order to have satisfactory circuit life.

Regarding claims 5 and 6, the applicant is claiming circuit traces on at least one of said conductive layers comprises a plurality of circuit traces as claimed in claim 5 and circuit traces on electrically conductive layer remote from the bending axis as claimed in claim 6. However, it is inherent to have traces on the conductive layer either on one layer or on both side of the circuit layer or on inner layer if it is a multilayer circuit board, depending upon the specific requirement of signal or power connection. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit board of JP898 having conductive layers with traces as claimed in claims 5 and 6, in order to have circuit with traces for either signal, power or ground connections.

11. Claims 7,9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Publication Number JP 11204898 A, hereafter JP898 as applied to claims 1-6, 8,10 and 11 above, and further in view of Sera et al., US Patent No. 5,461,202, hereafter Sera.

Regarding claim 7, 9 and 12, the applicant is claiming a polyimide for the dielectric layer in claim 7 and 12 and nickel for conductive layers in claim 9. However, both polyimide for dielectric layer for desired flexibility and Nickel for better resistance to environment is known in the art. Also Nickel under plating or under coating is commonly used for carrying out gold plating on copper layer to have better electrical connection with other component and better life in case of make and break connection of the trace or finger or pad connections. Sera discloses use of Polyimide as dielectric material and Nickel for the conductive material. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit board of JP898 with polyimide as dielectric layer in order to have the flexibility and conductive layer comprises Nickel in order to have better resistance to environment. Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

In re Leshin, 125 USPQ 416

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sera et al., Eriguchi et al., Miyaaki et al., Kornrumpf, Matsumoto et al., Uedo et al., Inaba et al., Nakagawa et al., Circuit board similar to applicant's claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (6:30 - 4) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

ibp
September 21, 2002


ALBERT W. PALADINI
PRIMARY EXAMINER